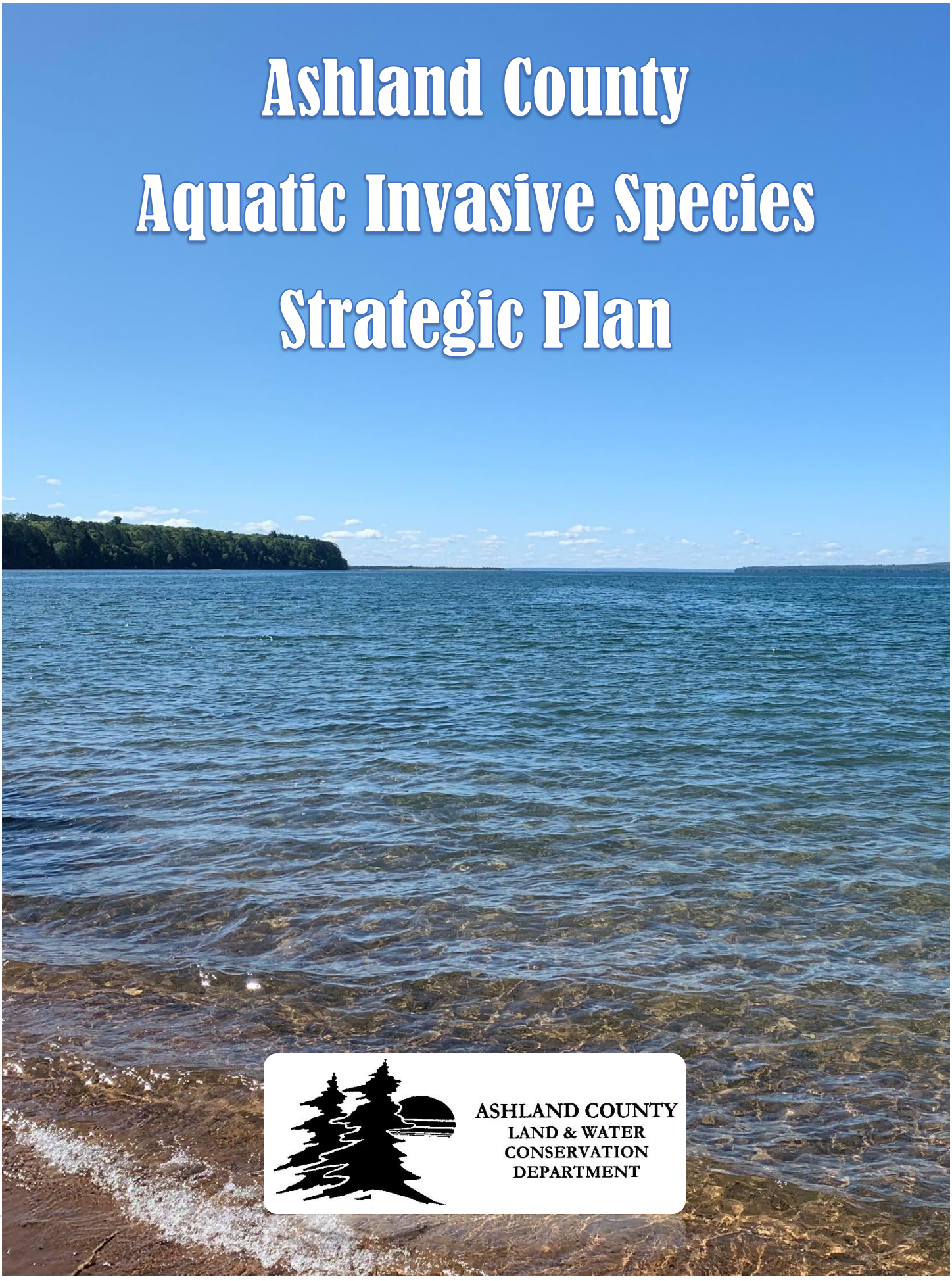
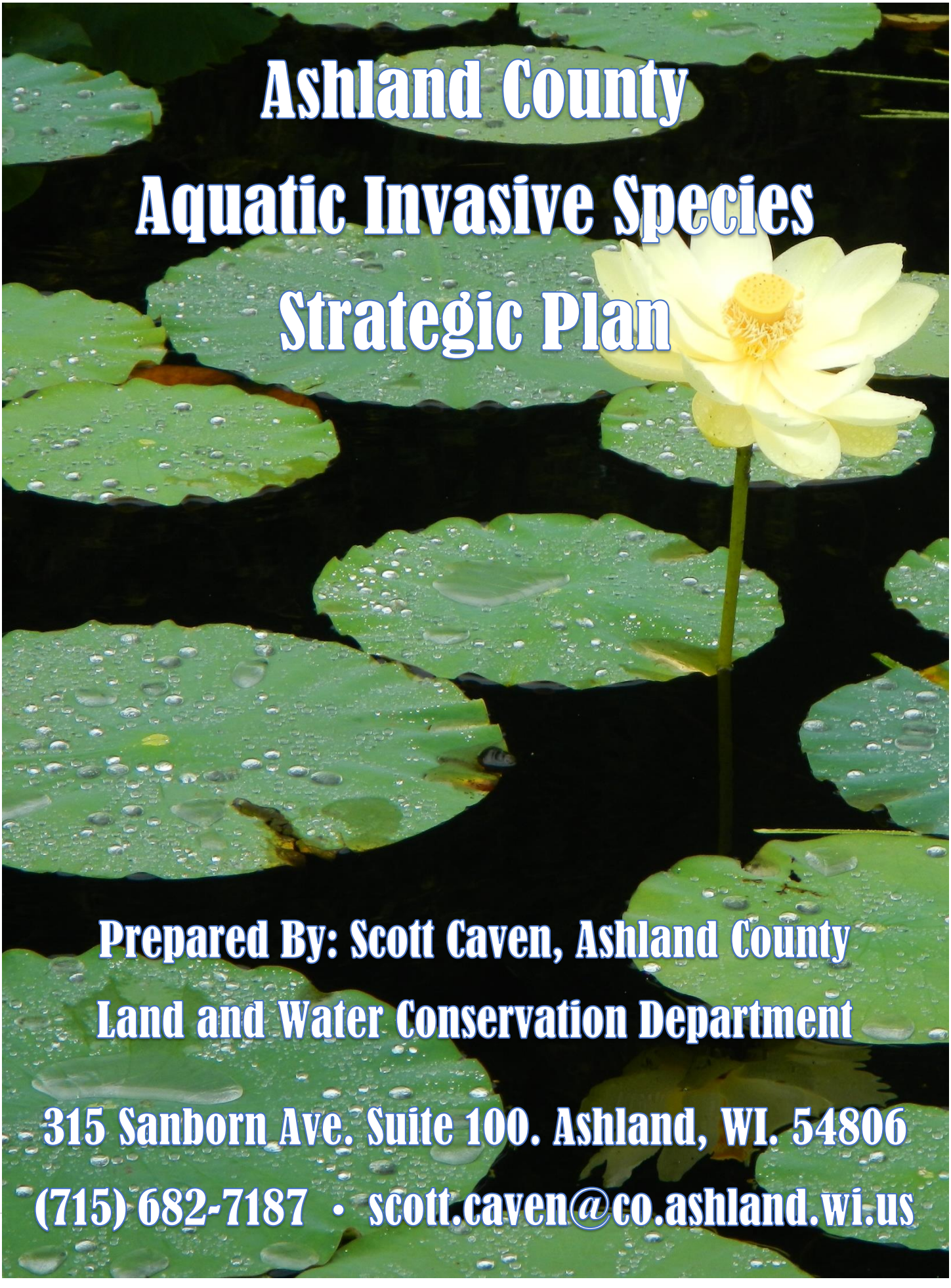
Ashland County
Aquatic Invasive Species
Strategic Plan



ASHLAND COUNTY
LAND & WATER
CONSERVATION
DEPARTMENT



Ashland County
Aquatic Invasive Species
Strategic Plan

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References and Capacity Building:

The *Ashland County Aquatic Invasive Species Strategic Plan* references and builds capacity upon existing resource management plans, including the *Ashland County Land and Water Resource Management Plan 2020-2024*, *Ashland County Invasive Species Plan,* and *Wisconsin Aquatic Invasive Species Management Plan*.

Funding:

The *Ashland County Aquatic Invasive Species Strategic Plan* was funded by an Aquatic Invasive Species Grant from the Wisconsin Department of Natural Resources, Grant Agreement AEPP-591-19.

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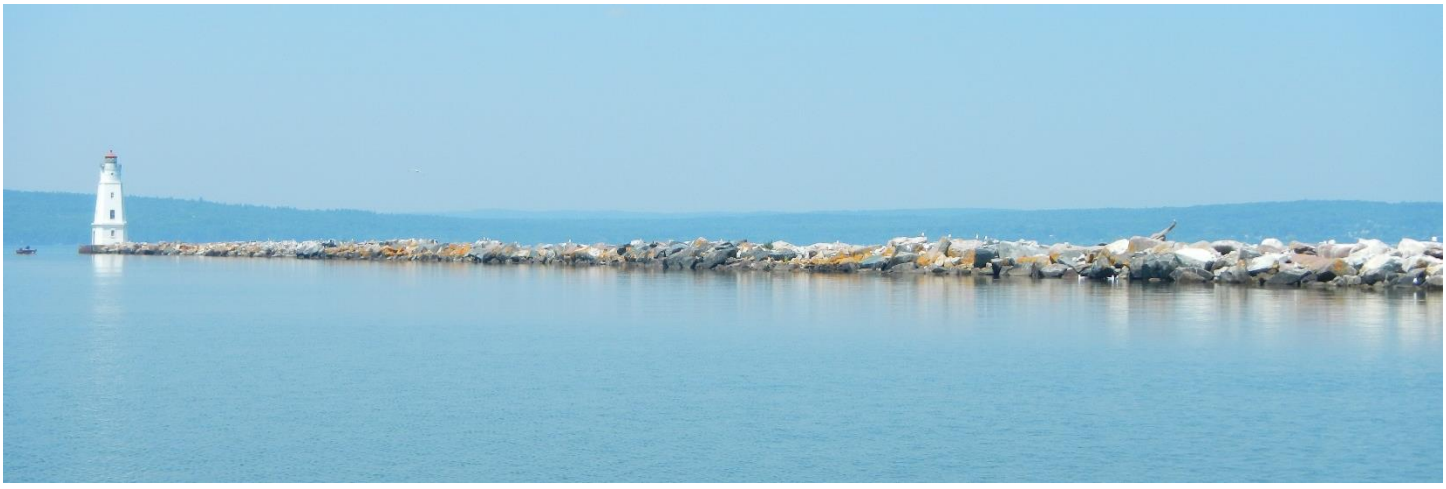


The historic Ashland Breakwater Lighthouse, located in Chequamegon Bay of Lake Superior. Photo Credit: Scott Caven.

Executive Summary

Wisconsin Statute Section 23.22 (1) (c) defines invasive species as "nonindigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health," while aquatic invasive species (AIS) refer to invasive species that threaten aquatic environments, including lakes, rivers, streams, creeks and wetlands.

Since 2021, the creation of the *Ashland County Aquatic Invasive Species Strategic Plan* (hereby referred to as "plan") and its ongoing implementation has been supported by the Ashland Area Aquatic Invasive Species Partnership – a dynamic group of stakeholders with a vested interest in protecting Ashland County's pristine water resources. This unique partnership includes representatives from the Wisconsin Department of Natural Resources, Bad River Tribe, City of Ashland, Ashland County Land and Water Conservation Department, Bayfield County Land and Water Conservation Department, Northwoods Cooperative Weed Management Area, Butternut-Schnur Lake Association, Lake Galilee Association, North Wisconsin Rod and Gun Club, and lakeshore property owners in Ashland County. The Ashland County Land and Water Conservation Department developed the plan and facilitated the contributions of the Ashland Area Aquatic Invasive Species Partnership.

Through this partnership, the plan was developed to prevent future introductions of AIS and to contain and control AIS already present in Ashland County waters. The intent of the plan is to guide future efforts of these partners and other stakeholders in the region, which include, but are certainly not limited to federal, state, county and local government, local tribes, non-governmental organizations, and citizen, conservation, sporting and recreation groups. To that end, three specific goals and associated management objectives and activities have been identified.

In collaboration with the Wisconsin Department of Natural Resources, and dovetailing the goals of the *Wisconsin Aquatic Invasive Species Management Plan*, the *Ashland County Aquatic Invasive Species Strategic Plan* strives to:

Goal 1: Prevent the introduction of new aquatic invasive species into Ashland County.

Goal 2: Contain the spread of existing aquatic invasive species in Ashland County.

Goal 3: Control populations of existing aquatic invasive species in Ashland County.

Similarly, in collaboration with the Wisconsin Department of Natural Resources, and dovetailing the objectives listed in the *Wisconsin Aquatic Invasive Species Management Plan*, the *Ashland County Aquatic Invasive Species Strategic Plan* strives to:

Objective 1: Engage stakeholders in aquatic invasive species education, outreach and partnership efforts.

Objective 2: Increase aquatic invasive species monitoring, reporting and mapping.

Objective 3: Support local law enforcement with the education and enforcement of aquatic invasive species regulations.

Objective 4: Collaborate with local and statewide partners on aquatic invasive species prevention, containment and control efforts.

Objective 5: Implement measures to control, reduce or eradicate aquatic invasive species.

The Ashland Area Aquatic Invasive Species Partnership has made great progress in coordinating and mobilizing AIS stakeholders in Ashland County; this plan is a continuation of this work. We now move to implement the plan, with the Ashland County Land and Water Conservation Department implementing certain components and serving as a catalyst and advocate for the remaining components. The success of this next phase ultimately relies on the involvement and support of all of the partners who have contributed thus far, as well as partners that will contribute in the future.

On behalf of the Ashland Area Aquatic Invasive Species Partnership, we invite you to join us in the implementation of the *Ashland County Aquatic Invasive Species Strategic Plan* and doing your part to prevent, contain and control aquatic invasive species in Ashland County.

Big Bay Lagoon on Madeline Island. Photo Credit: Scott Caven, Ashland County Land & Water Conservation Department.

Introduction

Aquatic invasive species are plants, animals and pathogens that are likely to cause harm to the environment, economy, recreation, aesthetics and human health. Aquatic invasive species have the ability to take over an ecosystem for a variety of reasons; they are prolific breeders, lack predators and competitors, outcompete native species for food, habitat and other resources, and are rarely susceptible to disease in the areas they invade. In fact, economic studies have shown that invasive species cost the United States a staggering $120 billion per year, while ballast water introduced invasive species cost the Great Lakes states $230 million per year. In addition, according to the Wisconsin Department of Natural Resources' *Wisconsin Aquatic Invasive Species Management Plan*, AIS may:

- Outcompete native species for food and habitat, causing displacement or reduced populations of native species.
- Change the composition and structure of aquatic communities, which can have negative cascading effects throughout aquatic food webs.
- Alter sportfishing opportunities, negatively affecting the recreation and tourism industries.
- Impede navigation and recreational boating activities.
- Reduce aesthetic appeal and impact swimming opportunities.
- Degrade habitat and negatively affect wildlife and water quality.
- Degrade shorelines and beaches, affecting the recreation and tourism industries.
- Negatively affect human and wildlife health through the spread of new diseases and pathogens.
- Decrease property values.
- Negatively affect commercially valuable species.
- Increase costs to utilities and municipalities.

In February 2019, the Ashland County Land and Water Conservation Department received an Aquatic Invasive Species Education, Prevention and Planning grant from the Wisconsin Department of Natural Resources. One task, among many, was to develop a strategic plan to prevent, contain and control AIS in Ashland County waters, including Lake Superior, inland lakes, rivers, creeks and wetlands.

In July 2019, the Ashland County Land and Water Conservation Department brought on an AIS Coordinator to lead AIS prevention, containment and control efforts on behalf of Ashland County and the Ashland Area Aquatic Invasive Species Partnership – a network of partners that have teamed up to combat AIS in the Ashland area. Members of the Ashland Area Aquatic Invasive Species Partnership include the Wisconsin Department of Natural Resources, Bad River Tribe, City of Ashland, Ashland County Land and Water Conservation Department, Bayfield County Land and Water Conservation Department, Northwoods Cooperative Weed Management Area, Butternut-Schnur Lake Association, Lake Galilee Association, North Wisconsin Rod and Gun Club, and lakeshore property owners in Ashland County. The Partnership serves as a steering committee for the Ashland County Land and Water Conservation Department, providing guidance on AIS prevention, containment and control efforts in Ashland County, including advising on the development and distribution of this plan.

Background

Ashland County's water resources are ecological, economic, cultural and aesthetic gems. Whether it's the Bad River or Lake Superior, Big Bay Lagoon or Copper Falls, Kakagon Sloughs or Lake Caroline, Ashland County boasts some of the state's greatest water resources.

Ashland County is home to 157 inland lakes spanning 5,936 acres. The majority of the lakes have minimal shoreline development and excellent water quality. There are over 1,000 miles of perennial streams and another 712 miles of intermittent waterways, as well as 479 miles of trout waters in 94 stream segments. There are over 170,000 acres of wetlands in the county; approximately 25% of the county's total land area. Last, but certainly not least, Lake Superior – the largest lake in the world (by surface area) – is the northern boundary of Ashland County. The county includes 18 of the 22 Apostle Islands: Madeline Island, Stockton Island, Gull Island, Outer Island, Oak Island, Basswood Island, Bear Island, Michigan Island, Hermit Island, Cat Island, Otter Island, Manitou Island, Rocky Island, Long Island, Ironwood Island, Devils Island, South Twin Island and North Twin Island. The islands have been dubbed the "Jewels of Lake Superior" and contain unique water features, including lagoons, bogs and the world-famous sea (and ice) caves.

However, these precious water resources have been and will continue to be under attack from AIS for a number of reasons. First off, there's the sheer amount of traffic the area receives from potential vectors, including boaters, anglers, hunters, trappers, paddlers, sailors and other outdoor enthusiasts. Many of them come from different states, or even different countries, significantly increasing the risk of AIS transmission. All of these user groups have the potential to spread AIS to and from Ashland County waters. This is especially true if they don't follow the AIS prevention steps required by NR40, Wisconsin's Invasive Species Rule:

- Inspect boats, trailers, and equipment.
- Remove all attached aquatic plants and animals.
- Drain all water from boats, vehicles, and equipment.
- Never move plants or live fish away from a waterbody.

Other vectors of transmission that already have or have the potential to spread AIS to and from Ashland County waters include the bait industry, aquaculture industry, aquarium trade, and lake and river service providers. For all of these reasons, Lake Superior is classified as a "super spreader," a high priority of the Wisconsin Department of Natural Resources for increased efforts to prevent, contain and control aquatic invasive species. Similarly, it is critical that AIS that are already present in Lake Superior, or could be present in the future, are not spread to Ashland County's inland lakes, rivers, streams, creeks, wetlands and other waterbodies.

A number of prohibited aquatic invasive species – spiny and fishhook waterfleas, faucet snails and quagga mussels – and restricted aquatic invasive species – zebra mussels, curly-leaf pondweed and Eurasian watermilfoil – have already been documented in Lake Superior and have the potential to spread to Ashland County's inland lakes, rivers, streams, creeks, wetlands and other waterbodies. Hundreds of additional restricted and prohibited aquatic invasive species are knocking on the door and have the potential to do the same.

Ashland County Physiography

Ashland County is located in northwestern Wisconsin and is 1,466,880 acres in area, of which 668,800 acres is land and 798,080 acres is water. All but four of the twenty-two Apostle Islands, a small archipelago in Lake Superior, are located in Ashland County. Ashland County is bordered by Bayfield County to the west, Iron County to the east, Price and Sawyer County to the south, and Lake Superior to the north.

The physical characteristics of Ashland County are largely a result of the most recent advance of the Laurentide Ice Sheet during a period known as the Wisconsin Glaciation, but also due to geologic processes dating back to the Precambrian period some 3,500 million years ago. Approximately 26,000 years ago during the Wisconsin Glaciation period, multiple lobes of the Laurentide Ice Sheet extended into what is now Wisconsin. This advance of ice contributed much to shaping the current landscape of Ashland County following ice retreat some 10,000 years ago.

Ashland County is divided into two major drainage basins at the St. Lawrence Seaway Continental Divide. The northern portion of the county drains mainly through the Bad River and its tributaries to Lake Superior. From there, the water continues through the other Great Lakes, the St. Lawrence Seaway, the Gulf of St. Lawrence and ultimately, the Atlantic Ocean. The southern portion of the county is drained by the Chippewa River and its tributaries to the Mississippi River and eventually, the Gulf of Mexico.

The northern portions of Ashland County are situated in the Superior Coastal Plain Ecological Landscape, one of sixteen ecoregions or landscapes throughout the state which exhibit distinct ecology and management opportunities. The Superior Coastal Plain on the mainland portion of Ashland County exists as the Lake Superior Lowlands, also known as the "red clay plain." This area has extensive areas of clay till and lake sediment deposits. The clay plain is mostly flat but slopes gently toward Lake Superior with occasional steep, deeply incised rivers. The clay of this region often has a reddish hue and is particularly noticeable in waterways and Lake Superior during runoff events. Many areas of the Lake Superior shoreline in the Superior Coastal Plain exhibit ecologically important coastal estuaries such as the Kakagon-Bad River Sloughs; a Ramsar wetland of international importance located within the Bad River Reservation in Ashland County.

The North Central Forest Ecological Landscape covers the southern half of Ashland County, transitioning from the Superior Coastal Plain located to the north. Landforms in this region are often features of terminal and ground moraines. The Winegar end moraine, known for its hummocky character and abundant lakes and bogs, is prominent just south of Mellen, Wisconsin. Another important landscape feature is the noticeably hilly and rocky terrain of the Keweenaw Fault and Penokee-Gogebic Range, running northeast across Ashland County into Iron County. The landscape is largely forested with mesic northern hardwoods being the predominant forest type with scattered pockets of hemlock, yellow birch, and white pine. Wetlands are very common in this landscape as are inland lakes, rivers and streams. Lakes in the North Central Forest portion of Ashland County are often a result of densely packed glacial till with a high water table. The abundant wetlands in Ashland County and throughout the North Central Forest are relatively undisturbed in contrast to wetlands located in other areas of Wisconsin and are of high ecological value. As a result, conservation and management of wetlands and their associated habitats is critical in Ashland County.

Purpose, Scope and Goals

Purpose:

Like its name suggests, the primary purpose of the *Ashland County Aquatic Invasive Species Strategic Plan* is to provide framework for aquatic invasive species management in Ashland County. And while it's true that preventing, containing and controlling the spread of zebra mussels, curly-leaf pondweed, purple loosestrife and other aquatic invasive species in Ashland County is no easy task, it can be accomplished through the implementation of relevant AIS prevention programs and projects, developing partnerships with a variety of stakeholder groups, vigilant AIS monitoring, rapid response and reporting, and most importantly, through communication and collaboration.

It is important to note that nearly the entire strategic plan is applicable outside Ashland County as well, and dovetails the efforts of the Wisconsin Department of Natural Resources' *Wisconsin Aquatic Invasive Species Management Plan*.

Scope:

The geographic scope of this plan is Ashland County in its entirety, including Lake Superior, inland lakes, rivers, creeks, wetlands and other waterbodies.

Goals:

This plan has three goals; all of which are vital to AIS management in Ashland County.

Goal 1: Prevent the introduction of new aquatic invasive species into Ashland County.

Goal 2: Contain the spread of existing aquatic invasive species in Ashland County.

Goal 3: Control populations of existing aquatic invasive species in Ashland County.

Flambeau River near Butternut, WI. Photo Credit: Scott Caven, Ashland County Land & Water Conservation Department.

Goals, Objectives and Activities

The goals, objectives and activities of the *Ashland County Aquatic Invasive Species Strategic Plan* were developed and will be implemented by the Ashland County Land and Water Conservation Department and a variety of partners. Similarly, the *Ashland County Aquatic Invasive Species Strategic Plan* references and builds capacity upon existing resource management plans, including the *Ashland County Land and Water Resource Management Plan 2020-2024*, *Ashland County Invasive Species Plan,* and *Wisconsin Aquatic Invasive Species Management Plan*.

Listed below are the goals, objectives and activities of the *Ashland County Aquatic Invasive Species Strategic Plan*, as well as a description, list of possible partners and list of existing resource management plans in which the activity builds capacity upon.

<table>
<tr><td colspan="3">Goal 1: Prevent the introduction of new aquatic invasive species into Ashland County.</td></tr>
<tr><td colspan="3">Objective 1: Engage stakeholders in aquatic invasive species education, outreach and partnership efforts.</td></tr>
<tr><td colspan="3">Activity 1: Coordinate a multi-faceted aquatic invasive species outreach campaign.</td></tr>
<tr><td>Description</td><td>Partners</td><td>Capacity Building</td></tr>
<tr><td>Educating the public is vital in preventing, containing and controlling aquatic invasive species. Thus, a multi-faceted aquatic invasive species outreach campaign will be launched to target specific user groups and educate them on AIS laws, threats, impacts, identification, reporting and best management practices.

Targeted audiences will include but are not limited to boaters, anglers, paddlers, hunters, trappers and other outdoor enthusiasts. “Alternative” user groups will also be targeted, including wakeboarders, water skiers, bird watchers, resort owners, bait dealers, marinas, sporting goods stores, realtors, campground managers, hunting and fishing guides, teachers, commercial fishermen, jet-skiers, sail boaters, pet owners and water gardeners.</td><td>Ashland County Land and Water Conservation Department

Northwoods Cooperative Weed Management Area

Wisconsin Department of Natural Resources

Lake Monitoring and Protection Network

Volunteers

Media Outlets</td><td>Ashland County Land and Water Resource Management Plan

Wisconsin Aquatic Invasive Species Management Plan

Lake Superior Lakewide Action and Management Plan</td></tr>
<tr><td colspan="3">Activity 2: Ensure all major boat landings and access points have current and consistent aquatic invasive species signage.</td></tr>
<tr><td>Description</td><td>Partners</td><td>Capacity Building</td></tr>
<tr><td>As of Fall 2021, all major boat landings and access points have current and consistent aquatic invasive species signage; most notably, the Wisconsin Department of Natural Resources “Prevent the Spread of Invasive Species – It’s the Law” sign.</td><td>Ashland County Land and Water Conservation Department</td><td>Ashland County Land and Water Resource Management Plan</td></tr>
</table>

Signage will now be inspected on a regular basis and replaced as necessary.	Wisconsin Department of Natural Resources Lake Monitoring and Protection Network	Wisconsin Aquatic Invasive Species Management Plan
Activity 3: Maintain a Clean Boats Clean Waters Program.		
Description	**Partners**	**Capacity Building**
Clean Boats Clean Waters is a watercraft inspection program in which staff or volunteers educate boaters and anglers about AIS and the AIS Prevention Steps. Launched in Ashland County in 2011, Clean Boats Clean Waters (CBCW) watercraft inspectors, both volunteers and paid staff, should focus efforts from "ice out" to "ice in," especially from Memorial Day to Labor Day. Watercraft inspectors play a valuable role in not only gathering data on boater behaviors and AIS, but also educating user groups about AIS via a non-regulatory, non-threatening, person-to-person approach. Volunteers from targeted user groups are ideal for conducting CBCW watercraft inspections because paying for these positions can be very costly. However, paid interns can be worthwhile, especially if they are only placed at high-traffic boat landings during peak days and times. To maximize the amount of contacts made per unit of time, watercraft inspections should occur during peak times on peak days at high-traffic boat landings. This information can be obtained from two primary sources: Clean Boats Clean Waters data and local knowledge. Using this information, the peak days in Ashland County are Friday, Saturday and Sunday. Holidays – particularly Memorial Day, Independence Day and Labor Day – are also excellent days to maximize the amount of contacts made. Peak times vary somewhat depending on the boat landing. For example, peak times for boat landings that are used primarily for boating, fishing and hunting are often busiest at dawn and dusk – like Second Landing. On the other hand, peak times for boat landings used primarily by recreational boaters are typically the busiest during the middle of the day – like Kreher Park Landing. Other peak times are during big events, like fishing tournaments (IE: Neighborly Bar tournaments, North Wisconsin Rod	Ashland County Land and Water Conservation Department Northwoods Cooperative Weed Management Area Bad River Tribe Wisconsin Department of Natural Resources Lake Monitoring and Protection Network Volunteers	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan

and Gun Club tournaments and the Kids Fishing Contest), as well as community events (IE: Bay Days). Similarly, weather has a tremendous impact on boat landing traffic. As one would expect, good "boating days" (IE: mostly sunny, little to no wind, no precipitation and pleasant temperatures) tend to have high levels of boat traffic, while poor "boating days" (IE: mostly cloudy, strong wind, rain, thunderstorms and unpleasant temperatures) tend to have low levels of boat traffic. Based off historical Clean Boats Clean Waters data and local knowledge, the following high-traffic boat landings should be the priority locations for Clean Boats Clean Waters watercraft inspections: Second Landing on Lake Superior in Ashland, Kreher Park Landing on Lake Superior in Ashland, and Hoffmann's Rocks Landing on Butternut Lake in Butternut.		
Objective 2: Increase aquatic invasive species monitoring, reporting and mapping.		
Activity 4: Maintain an AIS Early Detection Monitoring Program.		
Description	**Partners**	**Capacity Building**
Early detection of aquatic invasive species is vital to not only contain and control established populations but also to prevent future spread. As such, AIS Early Detection Monitoring should be conducted on both Lake Superior and Ashland County inland lakes. Monitoring will be conducted using the Wisconsin Department of Natural Resources AIS Early Detection Monitoring protocol. Ashland County Land and Water Conservation Department can, and should, partner on AIS Early Detection Monitoring efforts when appropriate.	Ashland County Land and Water Conservation Department Wisconsin Department of Natural Resources Lake Monitoring and Protection Network Lake Associations Volunteers	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan
Activity 5: Maintain a Citizen Lake Monitoring Network Program.		
Description	**Partners**	**Capacity Building**
Ashland County is home to some of the most pristine inland lakes in Wisconsin. Conducting AIS Early Detection Monitoring on these precious water resources will help ensure that they remain in pristine condition. Ashland County Land and Water Conservation Department will lead the county's Citizen Lake Monitoring Network Program; hosting workshops and	Ashland County Land and Water Conservation Department Wisconsin Department of Natural Resources	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan

assisting lake associations and other volunteer groups with their AIS monitoring efforts. Monitoring will be conducted using UW-Extension's Citizen Lake Monitoring Network Program protocol. Ashland County Land and Water Conservation Department can, and should, partner on Citizen Lake Monitoring Network efforts when appropriate.	UW-Extension Lakes Lake Monitoring and Protection Network Lake Associations Volunteers	
Objective 3: Support local law enforcement with the education and enforcement of aquatic invasive species regulations.		
Activity 6: Support local law enforcement, as needed, to educate the public about aquatic invasive species and the aquatic invasive species prevention steps.		
Description	**Partners**	**Capacity Building**
Since 2011, Ashland County Land and Water Conservation Department staff have been educating the public on AIS and the AIS Prevention Steps required under NR40 – Wisconsin's Invasive Species Rule: • Inspect boats, trailers, and equipment. • Remove all attached aquatic plants and animals. • Drain all water from boats, vehicles, and equipment. • Never move plants or live fish away from a waterbody. Ashland County Land and Water Conservation Department staff will continue to support local law enforcement with the education and enforcement of NR40 and the AIS Prevention Steps.	Ashland County Land and Water Conservation Department Wisconsin Department of Natural Resources Lake Monitoring and Protection Network Lake Associations Volunteers	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan
Goal 2: Contain the spread of existing aquatic invasive species in Ashland County.		
Objective 4: Collaborate with local and statewide partners on aquatic invasive species prevention, containment and control efforts.		
Activity 7: Actively engage with the Lake Monitoring and Protection Network.		
Description	**Partners**	**Capacity Building**
The Lake Monitoring and Protection Network (formerly referred to as the Wisconsin Aquatic Invasive Species Partnership) is a collaboration of the state and federal governments, counties and municipalities, tribes, non-profits, universities and citizens that have teamed up in the battle against aquatic invasive species. Ashland County Land and Water Conservation Department is a proud member of the Lake	Ashland County Land and Water Conservation Department Lake Monitoring and Protection Network	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan

Monitoring and Protection Network and will continue to partner with the LMPN in the years to come.		
Activity 8: Actively engage with the Northwoods Cooperative Weed Management Area.		
Description	**Partners**	**Capacity Building**
The Northwoods Cooperative Weed Management Area is a collective group of state and federal agencies, municipalities, tribes, non-profits, community organizations, and individuals who have come together to combat invasive species in Douglas, Bayfield, Ashland, and Iron counties in northern Wisconsin. The Ashland County Land and Water Conservation Department is a proud member of the Northwoods Cooperative Weed Management Area and will continue to partner with the NCWMA in the years to come.	Ashland County Land and Water Conservation Department Northwoods Cooperative Weed Management Area	Ashland County Land and Water Resource Management Plan
Goal 3: Control populations of existing aquatic invasive species in Ashland County.		
Objective 5: Implement measures to control, reduce or eradicate aquatic invasive species.		
Activity 9: Conduct activities to control, reduce or eradicate populations of AIS.		
Description	**Partners**	**Capacity Building**
The most common ways to control established populations of AIS are physical, chemical and biological control measures. Examples of physical control include hand-pulling Eurasian watermilfoil or using an "aquatic weed harvester" to cut curly-leaf pondweed. Examples of chemical control include using herbicides to treat yellow iris or species of invasive knotweed. Examples of biological control include using *Galerucella* beetles to treat purple loosestrife or using goats to treat invasive buckthorn. Time and funding permitting, the Ashland County Land and Water Conservation Department will implement control measures – prioritizing prohibited and restricted species listed under NR40, Wisconsin's Invasive Species Rule.	Ashland County Land and Water Conservation Department Northwoods Cooperative Weed Management Area Great Lakes Indian Fish and Wildlife Commission Bad River Tribe Wisconsin Department of Natural Resources Volunteers	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan Lake Superior Lakewide Action and Management Plan
Activity 10: Sustain the implementation of the Ashland County Aquatic Invasive Species Program, Aquatic Invasive Species Coordinator position and the *Ashland County Aquatic Invasive Species Strategic Plan*.		
Description	**Partners**	**Capacity Building**

Ultimately, successful AIS management in Ashland County – both now and in the future – will rely heavily on sustaining the Ashland County Aquatic Invasive Species Program, maintaining the Aquatic Invasive Species Coordinator position and implementing the *Ashland County Aquatic Invasive Species Strategic Plan*. The *Ashland County Aquatic Invasive Species Strategic Plan* should be viewed as a living, working document; therefore, it can and should be adapted as needed to most effectively prevent, contain and control AIS in Ashland County.	Ashland County Land and Water Conservation Department Northwoods Cooperative Weed Management Area Lake Monitoring and Protection Network Volunteers	Ashland County Land and Water Resource Management Plan Wisconsin Aquatic Invasive Species Management Plan Lake Superior Lakewide Action and Management Plan

Yellow iris control on Loon Lake at Copper Falls State Park. PC: Ashland County Land & Water Conservation Department.

Appendices

Appendix A: Ashland County Hydromap

Appendix B: Overview of AIS in Ashland County

Appendix C: AIS in Ashland County – Lake Superior

Appendix D: AIS in Ashland County – Inland Waters

Appendix E: Summary of AIS Prevention Programs

Appendix F: Current and Potential Stakeholders

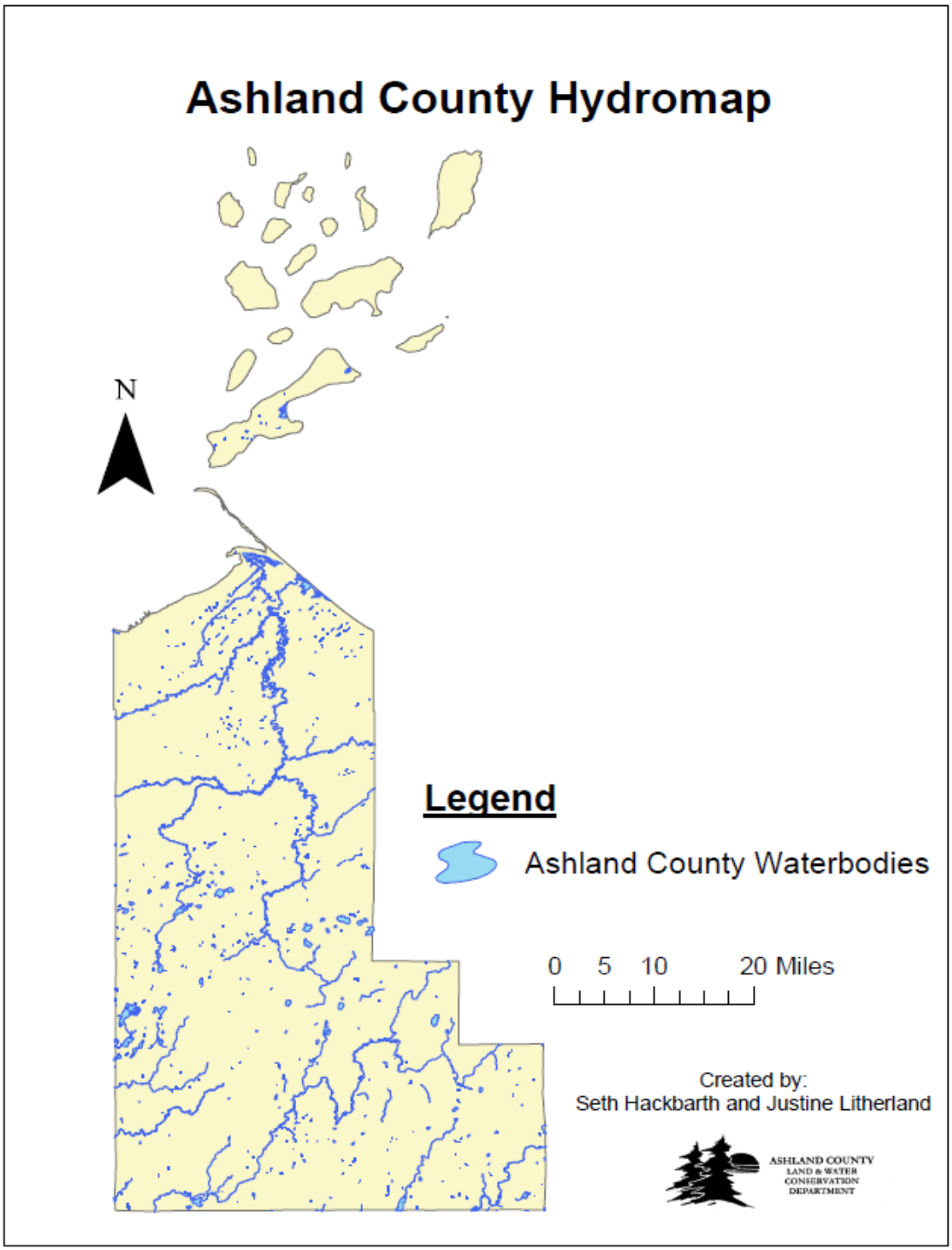
Appendix G: Acronyms

Educational outreach events, like Kids Fishing Day, Student Science Research Symposium and Invasive Species Identification Days, are excellent opportunities to engage and educate the public about aquatic invasive species and what everyone can do to help prevent, contain and control the spread. Photo Credit: Northern Great Lakes Visitor Center.

Appendix A:

Ashland County Hydromap

Figure 1: Ashland County Hydromap displaying a base map of the county, as well as the county's inland lakes, rivers, streams, creeks, wetlands and other waterbodies. The map was created with ArcMap 10.4 by Seth Hackbarth and Justine Litherland, AIS Interns with the Ashland County Land and Water Conservation Department, in September 2021.



Appendix B:

Overview of AIS in Ashland County

When it comes to the presence and absence of aquatic invasive species, Ashland County is in a very unique, critical situation.

According to the Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS), Lake Superior contains 95 non-native species, most of which are classified as invasive. Many of those 95 species have already been documented in the Ashland County delineated portion of Lake Superior, including sea lamprey, zebra mussels, quagga mussels, Eurasian watermilfoil, curly-leaf pondweed, purple loosestrife, ruffe, white perch and spiny waterflea. A plethora of other AIS that have been documented in Lake Superior, including Asian clam, bloody red shrimp and rock snot, also have the potential to spread to the Ashland County delineated portion of Lake Superior. Additionally, there are significant threats posed by AIS that aren't currently established in the Great Lakes but have the potential to do so; "heavy hitters" like silver carp, bighead carp, grass carp, black carp, hydrilla, Brazilian waterweed and snakehead.

Fortunately, Ashland County inland waters are very pristine and have very few AIS present. In fact, Ashland County is one of only a handful of counties in the state that doesn't have Eurasian watermilfoil or curly-leaf pondweed present in any inland waters. While there are a few established populations of Chinese mystery snails and banded mystery snails, as well as established populations of purple loosestrife, Ashland County inland waters contain very few AIS, especially NR40 prohibited and restricted species that pose severe threats to the environment, economy and human health.

Ultimately, to most effectively protect Lake Superior and Ashland County inland waters, it is of the utmost importance to *prevent* the introduction of new aquatic invasive species, as well as *contain* and *control* existing populations of AIS.

Abundant in Lake Superior, Eurasian watermilfoil (left) and curly-leaf pondweed (right) have never been documented in Ashland County inland waters. Photo Credits: Scott Caven, Ashland County Land & Water Conservation Department.

Appendix C:

AIS in Ashland County – Lake Superior

Figure 2: A list of the non-native species (with both the common name and scientific name) that have been documented in Lake Superior to date. The dataset was collected on September 30, 2021 from the Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) by Scott Caven, Ashland County Land & Water Conservation Department.

Common Name	Scientific Name
a centric diatom	Actinocyclus normanii f. subsalsa
a red alga	Bangia atropurpurea
a centric diatom	Cyclotella atomus
rock snot	Didymosphenia geminata
a centric diatom	Discostella pseudostelligera
a centric diatom	Skeletonema potamos
a centric diatom	Thalassiosira baltica
a centric diatom	Thalassiosira weissflogii
a tubificid worm	Potamothrix bedoti
a tubificid worm	Potamothrix moldaviensis
a tubificid worm	Potamothrix vejdovskyi
an oligochaete	Ripistes parasita
furunculosis, ulcer disease, erythrodermatitis	Aeromonas salmonicida
bacterial kidney disease (BKD), Dee disease	Renibacterium (Corynebacterium) salmoninarum
a scud	Echinogammarus ischnus
a freshwater shrimp	Gammarus fasciatus
tiger scud	Gammarus tigrinus
a water flea	Bosmina coregoni
spiny waterflea	Bythotrephes longimanus
fishhook waterflea	Cercopagis pengoi
a copepod	Cyclops strenuus
a calanoid copepod	Eurytemora affinis
a harpacticoid copepod	Nitokra hibernica
gill louse	Salmincola edwardsii
a parasitic copepod	Salmincola lotae
an oarsman	Schizopera borutzkyi
a copepod	Thermocyclops crassus
Rusty Crayfish	Faxonius rusticus
bloody red shrimp	Hemimysis anomala
Alewife	Alosa pseudoharengus
American Eel	Anguilla rostrata

Fourspine Stickleback	Apeltes quadracus
Freshwater Drum	Aplodinotus grunniens
Goldfish	Carassius auratus
Common Carp	Cyprinus carpio
Threespine Stickleback	Gasterosteus aculeatus
Ruffe	Gymnocephalus cernua
Brook Silverside	Labidesthes sicculus
White Perch	Morone americana
Round Goby	Neogobius melanostomus
Pink Salmon	Oncorhynchus gorbuscha
Coho Salmon	Oncorhynchus kisutch
Rainbow Trout	Oncorhynchus mykiss
Chinook Salmon	Oncorhynchus tshawytscha
Rainbow Smelt	Osmerus mordax
Sea Lamprey	Petromyzon marinus
Freshwater Tubenose Goby	Proterorhinus semilunaris
Atlantic Salmon	Salmo salar
Brown Trout	Salmo trutta
Asian clam	Corbicula fluminea
zebra mussel	Dreissena polymorpha
quagga mussel	Dreissena rostriformis bugensis
greater European peaclam	Pisidium amnicum
pygmy peaclam	Pisidium moitessierianum
European fingernail clam	Sphaerium corneum
mud bithynia, faucet snail	Bithynia tentaculata
liver elimia	Elimia livescens
New Zealand mudsnail	Potamopyrgus antipodarum
European stream valvata	Valvata piscinalis
banded mysterysnail	Viviparus georgianus
redtop	Agrostis gigantea
flowering rush	Butomus umbellatus
marsh thistle	Cirsium palustre
poison-hemlock	Conium maculatum
glossy buckthorn	Frangula alnus
ornamental jewelweed	Impatiens glandulifera
yellow iris	Iris pseudacorus
rough water-horehound	Lycopus asper
purple loosestrife	Lythrum salicaria
water mint	Mentha aquatica
forget-me-not	Myosotis scorpioides
Eurasian watermilfoil	Myriophyllum spicatum
water-cress	Nasturtium officinale

oakleaf goosefoot	Oxybasis glauca
spotted ladysthumb	Persicaria maculosa
reed canarygrass	Phalaris arundinacea
curly-leaf pondweed	Potamogeton crispus
keek	Rorippa sylvestris
door-yard dock	Rumex longifolius
bluntleaf dock	Rumex obtusifolius
hyrbid crack willow	Salix Ã— fragilis
golden willow	Salix alba
purple osier	Salix purpurea
bitter nightshade	Solanum dulcamara
northern bur-reed	Sparganium glomeratum
narrow-leaved cattail	Typha angustifolia
a monogenetic fluke	Dactylogyrus amphibothrium
a monogenetic fluke	Dactylogyrus hemiamphibothrium
a digenean fluke	Ichthyocotylurus pileatus
a digenean fluke, trematode	Timoniella sp.
a microsporidian parasite	Heterosporis sutherlandae
salmonid whirling disease	Myxobolus cerebralis
a testate amoeba	Psammonobiotus communis
a testate amoeba	Psammonobiotus dziwnowi
Viral Hemorrhagic Septicemia Virus (VHSV-IVb)	Novirhabdovirus sp. genotype IV sublineage b

Rusty crayfish, identified by a distinct “rust spot” on each side of their carapace, pose a significant threat to Lake Superior and Ashland County inland waters. Photo Credit: Scott Caven, Ashland County Land & Water Conservation Department.

Appendix D:

AIS in Ashland County – Inland Waters

Figure 3: Listed below are the aquatic invasive species that have been documented in Ashland County inland waters to date. The dataset was collected on October 4, 2021 from the Wisconsin Department of Natural Resources website by Scott Caven, Ashland County Land & Water Conservation Department.

Waterbody	Common Name
Augustine Lake	Purple Loosestrife
Butternut Lake	Banded Mystery Snail, Purple Loosestrife, Rusty Crayfish, Ornamental water lilies (non-native Nymphaea sp.), Chinese Mystery Snail, Yellow Iris.
Day Lake	Chinese Mystery Snail
English Lake	Purple Loosestrife
Galilee Lake	Purple Loosestrife, Banded Mystery Snail.
Gordon Lake	Chinese Mystery Snail
Little Butternut Lake	Chinese Mystery Snail
Long Lake	Chinese Mystery Snail
Long Lake	Chinese Mystery Snail
Loon Lake	Chinese Mystery Snail, Yellow Iris, Purple Loosestrife.
Meder Lake	Purple Loosestrife
Upper Clam Lake	Banded Mystery Snail
Upper Park Falls Flowage	Chinese Mystery Snail
Zielke Lake	Chinese Mystery Snail

Banded mystery snails (left), purple loosestrife (center) and Chinese mystery snails (right) discovered during AIS Early Detection Monitoring by LWCD. Photo Credits: Scott Caven, Ashland County Land & Water Conservation Department.

Appendix E:

Summary of AIS Prevention Programs

Listed below are summaries of the primary AIS prevention programs that have been implemented in Ashland County. All of these programs were referenced in the *Ashland County Aquatic Invasive Species Strategic Plan*. The purpose of these summaries is to provide the reader with a better understanding of what each individual program entails and how it can be used to help prevent, contain and control aquatic invasive species in Ashland County.

Aquatic Invasive Species Early Detection Monitoring is one of Ashland County Land and Water Conservation Department's keystone programs. Aquatic Invasive Species Early Detection Monitoring allows resource managers to detect populations of aquatic invasive species early on, and ultimately, control the populations before they become detrimental to the environment, economy, native flora and fauna, human health and aesthetics. An added bonus of Aquatic Invasive Species Early Detection Monitoring is that the public finds it extremely interesting, making it a top-notch AIS educational outreach tool. Photo Credit: Scott Caven, Ashland County Land & Water Conservation Department.

Clean Boats Clean Waters

Clean Boats Clean Waters (CBCW) is a watercraft inspection program in which participants – both volunteers and paid staff – are trained to properly inspect boats, trailers and equipment at high-traffic boat landings and educate boaters and anglers on preventing the spread of AIS. Watercraft inspectors are also trained how to properly identify AIS and enter their watercraft inspection data into the Wisconsin Department of Natural Resources' Surface Water Integrated Monitoring System database. Watercraft inspectors remind boaters and anglers about the aquatic invasive species prevention steps required by Wisconsin state law – inspecting boats, trailers and equipment, removing all attached aquatic plants and animals, draining all water from boats, vehicles and equipment and never moving plants or live fish away from a waterbody. In addition, watercraft inspectors distribute AIS outreach materials like brochures, identification cards and stickers.

For more information on Clean Boats Clean Waters, please visit:
http://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/cbcw/default.aspx

Clean Boats Clean Waters is an excellent way to educate boaters, anglers, hunters, paddlers and other outdoor enthusiasts about AIS and the AIS Prevention Steps required by Wisconsin state law – inspecting boats, trailers and equipment, removing all attached aquatic plants and animals, draining all water from boats, vehicles and equipment and never moving plants or live fish away from a waterbody. Photo Credit: Ashland County Land & Water Conservation Department.

Citizen Lake Monitoring Network

Citizen Lake Monitoring Network (CLMN) is an aquatic invasive species monitoring program that trains citizens, lake property owners and lake associations how to properly search for Eurasian watermilfoil, zebra mussels, rusty crayfish and other AIS in their favorite lakes. The frequency that volunteers perform AIS monitoring varies, but most volunteers do this a few times per year. Most volunteers conduct AIS monitoring in high-risk sites around their lakes (like boat landings) to detect early populations of AIS. Early detection of AIS is crucial for effective, inexpensive management, so these volunteers are incredibly valuable.

For more information on Citizen Lake Monitoring Network, please visit:
https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/clmn/AIS.aspx

Citizen Lake Monitoring Network is a wonderful way for citizens, lake property owners, lake associations and other water enthusiasts to learn more about their favorite lakes and help protect them from AIS. If that wasn't enough – Citizen Lake Monitoring Network is a lot of fun! Photo Credit: Scott Caven, Ashland County Land & Water Conservation Department.

Project RED

Project RED (Riverine Early Detectors) is a monitoring program in which participants are trained to monitor for 21 aquatic invasive species in their favorite river, stream or creek via boat, kayak or wading. The monitoring can be done from April to October. Participants attend a training session to learn how to properly identify and report aquatic invasive species, select monitoring locations and set up a monitoring schedule. Project RED is a favorite among boaters, kayakers and anglers – they're already on the water, so why not keep an eye out for zebra mussels, rusty crayfish, Eurasian watermilfoil and other aquatic invasive species?

For more information on Project RED, please visit:
https://www.wisconsinrivers.org/our-work/project-red

Ashland County Land and Water Conservation Department staff conducting Project RED AIS Monitoring in the Fish Creek Sloughs near Ashland, WI. Photo Credit: Scott Caven, Ashland County Land & Water Conservation Department.

Bait Dealer Initiative

The Bait Dealer Initiative is an effort to educate bait dealers and their staff on the threats that aquatic invasive species pose on their business and Wisconsin's water resources. Bait dealers are considered "opinion leaders" among the boating and fishing community and interact with boaters and anglers on a daily basis. Therefore, educating bait dealers on AIS creates a "ripple effect" as they pass that information along to their customers. Along with training bait dealers on the basics of aquatic invasive species, educational outreach materials – Stop Aquatic Hitchhikers bobbers, floating keychains, AIS ID cards and brochures – are provided for bait dealers to distribute to their customers.

Currently, Ashland County has five participating bait dealers:

1) Anglers All – Ashland, WI.
2) River Rock Inn and Bait Shop – Ashland, WI.
3) Ransom's Place – Clam Lake, WI.
4) Butternut Feed Store – Butternut, WI.
5) Clam Lake Junction – Clam Lake, WI.

For more information on the Bait Dealer Initiative, please visit:
http://dnr.wi.gov/lakes/invasives/baitdealer.aspx

Aquatic invasive species outreach programs, like the Bait Dealer Initiative, are vital in educating AIS stakeholder groups and the public about AIS and AIS prevention. Photo Credit: Ashland County Land & Water Conservation Department.

AIS Snapshot Day

AIS Snapshot Day is a citizen-science monitoring event in which over 100 water enthusiasts from across the state of Wisconsin help monitor for 21 aquatic invasive species in lakes, rivers, streams and creeks. Participants attend a training session to learn how to properly identify aquatic invasive species, grab their monitoring equipment and head to their monitoring locations in search of water lettuce, water hyacinth, parrot feather, Eurasian watermilfoil, New Zealand mudsnails and other aquatic invasive species. After the monitoring is done, participants meet back at a "rendezvous site" to share findings and have some refreshments. This is a one-day event held in August or September.

For more information on the AIS Snapshot Day, please visit:
https://www.wisconsinrivers.org/events/display/item/snapshot-day

A volunteer discovers and properly identifies purple loosestrife – a common, yet detrimental aquatic invasive plant found in all 72 counties in Wisconsin – along a riverbank during AIS Snapshot Day. Photo Credit: River Alliance of Wisconsin.

Invasive Species Control

Although prevention and containment are the most effective ways to stop the spread of invasive species, control measures can and should be implemented in some circumstances. This is especially true when the established population is classified as a prohibited or restricted species under NR40, Wisconsin's Invasive Species Rule. The most common ways to control established populations of invasive species are by implementing physical, chemical and biological control measures.

Biologically controlling purple loosestrife (top) and mechanically controlling yellow iris (bottom) are safe, effective, low-cost options to control aquatic invasive species. Photo Credits: Ashland County Land & Water Conservation Department.

Landing Blitz

The Landing Blitz, a spin-off of Clean Boats Clean Waters, consists of ramping up watercraft inspection efforts at high-traffic boat landings around the 4th of July – the peak of the boating season. In addition to conducting watercraft inspections, watercraft inspectors distribute Stop Aquatic Hitchhikers towels to boaters that follow all of the prevention steps required by Wisconsin state law – inspecting boats, trailers and equipment for attached plants, animals and mud, removing any plants, animals or mud, draining all water from boats, motors and livewells, and not moving live fish away from a waterbody.

For more information on the Landing Blitz, please visit:
http://dnr.wi.gov/lakes/invasives/landingblitz.aspx

Ashland County Land and Water Conservation Department staff conducting Clean Boats Clean Waters watercraft inspections during the 2021 Landing Blitz. Photo Credit: Ashland County Land & Water Conservation Department.

Drain Campaign

Research suggests that boaters and anglers understand and follow most of Wisconsin's AIS laws – inspecting boats, trailers and equipment for attached plants, animals and mud, and removing any plants, animals or mud; however, there is room for improvement when it comes to draining all of the water from boats, vehicles and equipment and never moving live fish away from a waterbody. The Drain Campaign is an AIS outreach event specifically designed to educate and encourage boaters and anglers to drain all of the water from their boat, trailer, vehicle, livewell and equipment, and put their catch on ice. As part of the Drain Campaign, watercraft inspectors educate boaters and anglers on Wisconsin's AIS laws and distribute Stop Aquatic Hitchhikers ice packs to compliant anglers that want to ice their catch.

For more information on the Drain Campaign, please visit:
http://dnr.wi.gov/lakes/invasives/drainingcampaign.aspx

Like many other organizations, Ashland County Land and Water Conservation Department has and will continue to make adaptations with regards to the COVID-19 pandemic; continuing to educate the public on AIS but doing our best to keep ourselves and others safe and healthy. Photo Credit: Ashland County Land & Water Conservation Department.

Aquatic Invasive Species Early Detection Monitoring – Lake Superior

Aquatic Invasive Species Early Detection Monitoring – searching for AIS in lakes and other waterbodies – is vital to successfully discover, identify and control populations of AIS before they are able to "overtake" or "outcompete" native flora and fauna. Aquatic Invasive Species Early Detection Monitoring can be conducted on massive waterbodies like Lake Superior, tiny waterbodies like Gates Lake, and everything in between. Aquatic Invasive Species Early Detection Monitoring typically includes a snorkeling survey, visual survey, meander survey and "rake tossing" to sample the plant and animal species at each site.

For more information on Aquatic Invasive Species Early Detection Monitoring, please visit: https://dnr.wisconsin.gov/topic/Lakes/AIS/Monitoring.html

For Aquatic Invasive Species Early Detection Monitoring on Lake Superior, Ashland County Land and Water Conservation Department staff typically focus on high-traffic, highly-disturbed locations that invasive species can thrive in, like boat landings, marinas, beaches and parks. Photo Credits: Ashland County Land & Water Conservation Department.

Aquatic Invasive Species Early Detection Monitoring – Inland Lakes

Aquatic Invasive Species Early Detection Monitoring – searching for AIS in lakes and other waterbodies – is vital to successfully discover, identify and control populations of AIS before they are able to "overtake" or "outcompete" native flora and fauna. Aquatic Invasive Species Early Detection Monitoring can be conducted on massive waterbodies like Lake Superior, tiny waterbodies like Gates Lake, and everything in between. Aquatic Invasive Species Early Detection Monitoring typically includes a snorkeling survey, visual survey, meander survey and "rake tossing" to sample the plant and animal communities at each site.

For more information on Aquatic Invasive Species Early Detection Monitoring, please visit: https://dnr.wisconsin.gov/topic/Lakes/AIS/Monitoring.html

Ashland County Land and Water Conservation Department staff conducting a snorkel survey at Target Site #1 during Aquatic Invasive Species Early Detection Monitoring on Lake Three near Mellen, WI. Photo Credit: Taylor Caven.

Appendix F:

Current and Potential Stakeholders

Ashland County Land and Water Conservation Department has a long history of strong partnerships at both the regional and statewide level, including, but certainly not limited to federal, state, county and local governments, local tribes, non-governmental organizations, colleges, schools and citizen, conservation, sporting and recreational groups.

The development of the *Ashland County Aquatic Invasive Species Strategic Plan* was spearheaded by the Ashland County Land and Water Conservation Department in partnership with the Ashland Area Aquatic Invasive Species Partnership – a network of partners that have teamed up to combat AIS in the Ashland area. Members of the Ashland Area Aquatic Invasive Species Partnership include the Wisconsin Department of Natural Resources, Bad River Tribe, City of Ashland, Ashland County Land and Water Conservation Department, Bayfield County Land and Water Conservation Department, Northwoods Cooperative Weed Management Area, Butternut-Schnur Lake Association, Lake Galilee Association, North Wisconsin Rod and Gun Club, and lakeshore property owners in Ashland County.

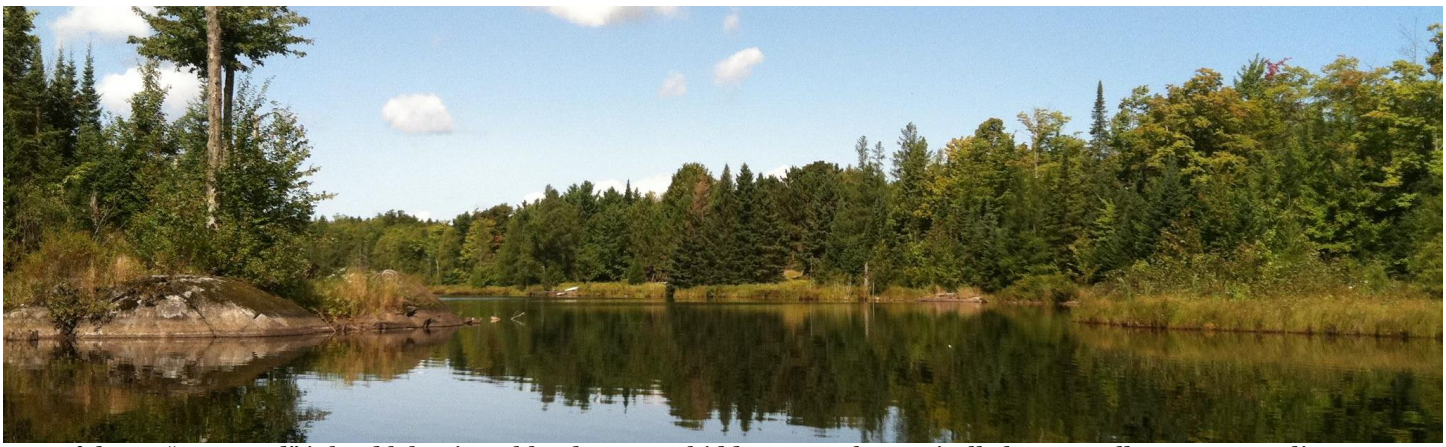
Ashland County Land and Water Conservation Department will continue to partner with all of the organizations listed above, as well as new organizations, when applicable.

Ashland County Land and Water Conservation Department has a long history of strong, successful partnerships with a variety of organizations and stakeholder groups, both at the local and statewide level, including federal, state, county and local governments, local tribes, non-governmental organizations, colleges, schools and citizen, conservation, sporting and recreational groups. Photo Credit: Ashland County Land & Water Conservation Department.

Appendix G:

Acronyms

AC – Ashland County
AIS – Aquatic Invasive Species
ANS – Aquatic Nuisance Species
CBCW – Clean Boats Clean Waters
CLMN – Citizen Lake Monitoring Network
CLP – Curly-leaf Pondweed
DNR – Department of Natural Resources
EDRR – Early Detection Rapid Response
EWM – Eurasian Watermilfoil
GIS – Geographic Information Systems
GLANSIS – Great Lakes Aquatic Nonindigenous Species Information System
GLEDN – Great Lakes Early Detection Network
GLIFWC – Great Lakes Indian Fish and Wildlife Commission
IS – Invasive Species
LMPN – Lake Monitoring and Protection Network
LWCD – Land and Water Conservation Department
NCWMA – Northwoods Cooperative Weed Management Area
NGLVC – Northern Great Lakes Visitor Center
NR40 – Natural Resources 40 (Wisconsin's Invasive Species Rule)
PC – Photo Credit
PL – Purple Loosestrife
RED – Riverine Early Detectors
SWDV – Surface Water Data Viewer
SWIMS – Surface Water Integrated Monitoring System
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
UWEX – University of Wisconsin Extension
WDNR – Wisconsin Department of Natural Resources

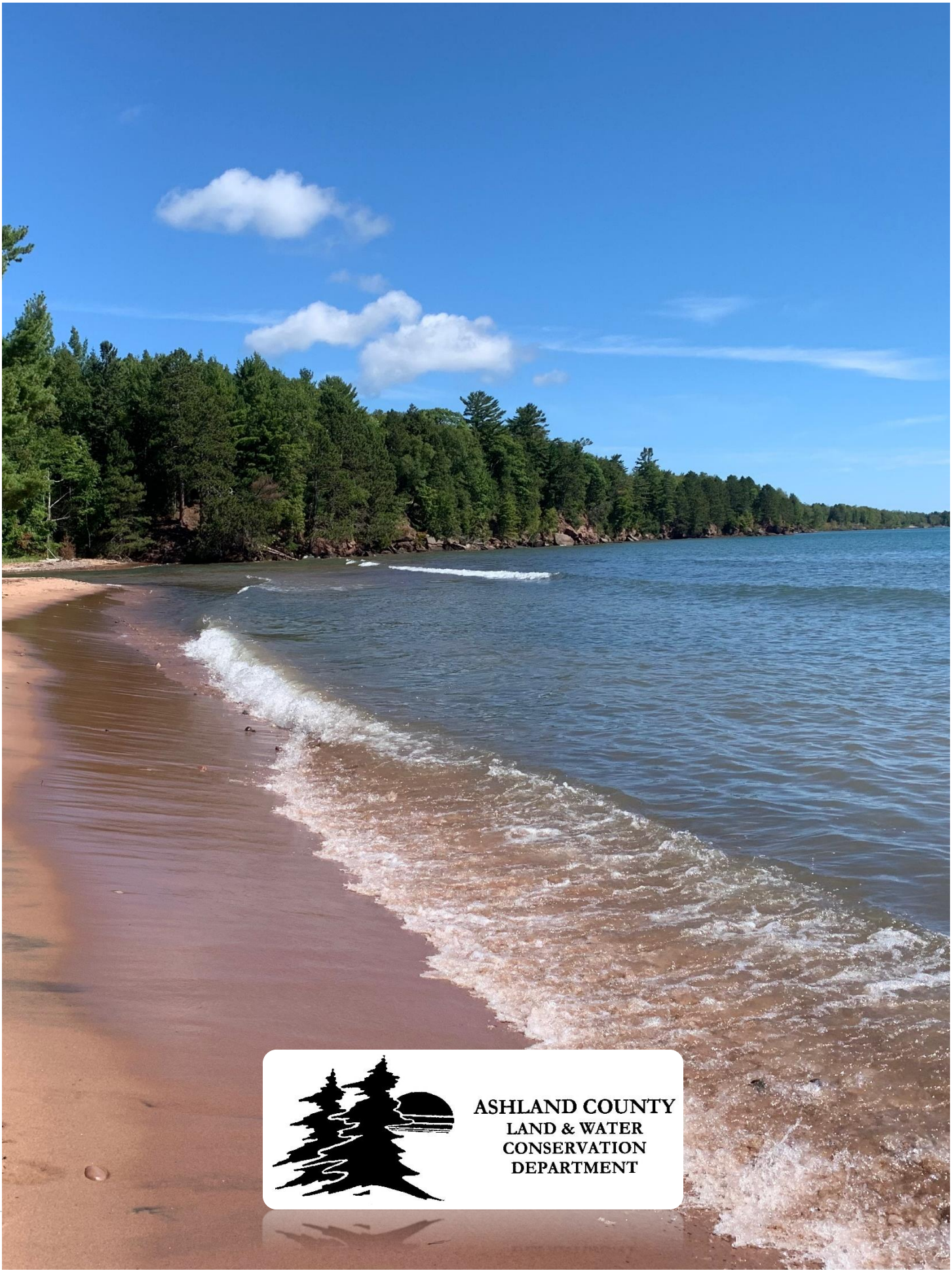


One of the 73 "unnamed" inland lakes in Ashland County; hidden gems that typically have excellent water quality, top-notch habitat for fish and wildlife, and picturesque views. PC: Ashland County Land & Water Conservation Department.

Works Cited

Ashland County Land and Water Resource Management Plan 2020-2024
Ashland County Invasive Species Plan
Great Lakes Aquatic Nonindigenous Species Information System
Lake Superior Aquatic Invasive Species Complete Prevention Plan
Lake Superior Lakewide Action and Management Plan 2015-2019
Wisconsin Aquatic Invasive Species Management Plan
Wisconsin Department of Natural Resources Surface Water Data Viewer
Wisconsin Department of Natural Resources Surface Water Integrated Monitoring System
Wisconsin Department of Natural Resources Website

Ashland County Land and Water Conservation Department teamed up with students and staff from the School District of Mellen on a Purple Loosestrife Biocontrol Project. Photo Credit: Ashland County Land & Water Conservation Department.



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